

Name: _____

Date: _____

LAB: DETERMINING LUNG VOLUMES

Many factors can influence lung capacity.

In this activity, you will:

- measure your Tidal Volume (TV)- normal breathing volume
- measure your vital capacity (VC) at rest
- compare your results with rest of the class by sorting the results according to height/ weight, male/female, level of physical fitness
- measure your VC after exercise and compare with the VC measured at rest.

Hypothesis:

- Does Height/ weight, sex or physical fitness level affect VC?
- Does VC decrease or increase after exercise?

Materials:

- Assembled SPIROMETER using everyday items
- Stopwatch

Procedure:

1. Assemble the SPIROMETER as directed.
2. Monitor your breathing pattern until it is regular and relaxed. Then, after inhaling normally, place the mouthpiece in your mouth and exhale normally through your mouth. Close the mouthpiece of the spirometer as quickly as possible.
3. Observe and record on your chart, the volume of air (cm^3) in the bag. This is your **Tidal Volume (TV)**. Squeeze the air out of the bag.Repeat.
4. This time take a deep breath and then exhale fully through your mouth, forcing the maximum volume of air from your lungs. Record your **Vital Capacity**.Repeat. Make sure you squeeze the air out of the spirometer between readings.
5. Write your vital capacity under the appropriate categories on the class chart.
 - Male/female
 - Height: 150-160 cm, 160-170 cm, 170-180 cm
 - Subjective fitness level: poor, good, excellent

Extension:

1. Exercise for 1 minute by either doing jumping jacks or jogging in place. Make sure your breathing rate (number of times you inhale/exhale per minute) has increased.
2. Measure your vital capacity immediately after one minute of exercise. Record your vital capacity on your chart.

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Measured Volumes: #1 #2

Tidal Volume (cm ³)		
Vital Capacity (cm ³) at rest		
Vital Capacity (cm ³) after exercise		

Estimated vital capacities Males by height ^{[2]:182}

Height	150-155cm	155-160cm	160-165cm	165-170cm	170-175cm	175-180cm
	5'-5'2"	5'2"-5'4"	5'4"-5'6"	5'6"-5'8"	5'8"-5'10"	5'10"-6'
	2900	3150	3400	3720	3950	4300

Age	15-25 yrs.	25-35 yrs	35-45 yrs.
VC	3425	3500	3225

Analysis: (T/I)

- Each group will be assigned to graph the measured vital capacity and one factor.
(Use graph paper)
- What conclusions can you make from your graph about the factor and its effect on Vital Capacity? (Answer in complete sentences)

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Inquiry: (A/C) (Answer in complete sentences)

1. Why would the various factors affect the Vital Capacity?

2. How does exercise affect the Vital Capacity?-

3. The Olympic Games were held in Mexico City which is at a high altitude. The air in Mexico City contains 30% less oxygen than at sea level.

- a. What symptoms may occur upon arrival in Mexico City?

- b. How can Athletes prepare for these Olympic Games?

- c. Would it benefit them if they trained at a higher altitude?

- d. What is blood doping? How does blood doping improve performance?
